Nov. 12, 1957 A. L. CARRON 2,812,681

ELECTRICALLY OPERATED KEY-CHANGING HARP MECHANISM

Filed Nov. 13, 1953 3 Sheets-Sheet 1

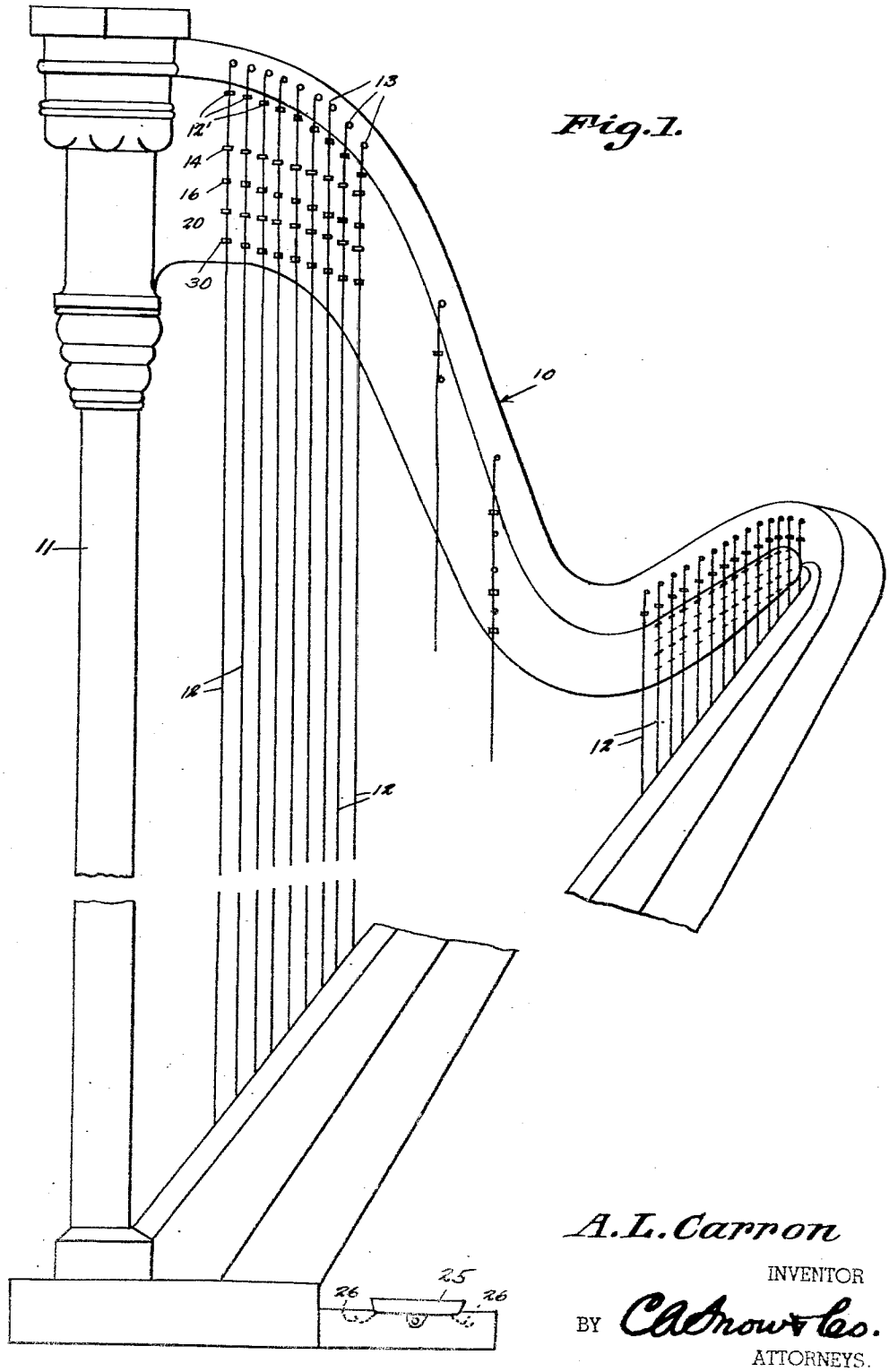


Fig. 1.

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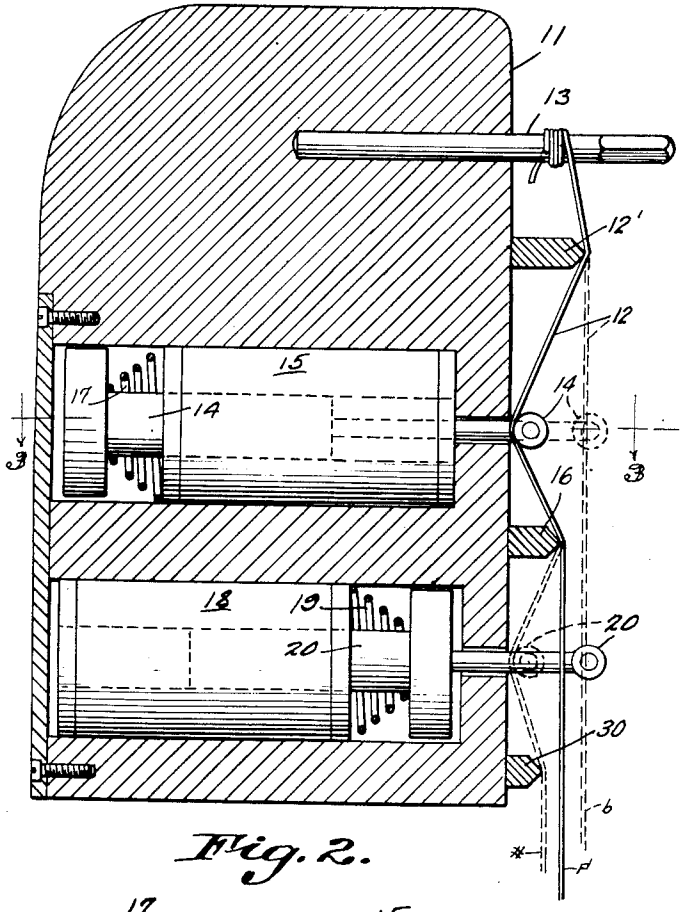


Fig. 2.

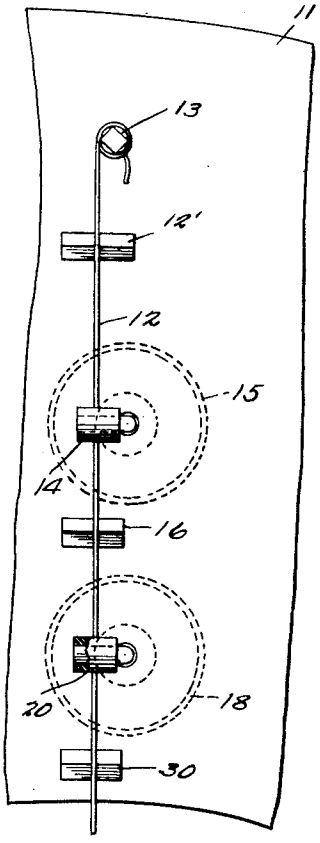


Fig. 4.

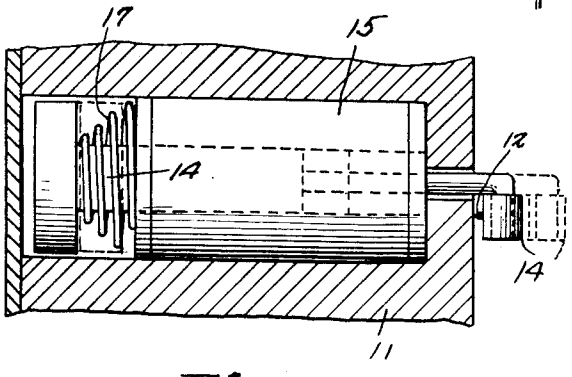


Fig. 3.

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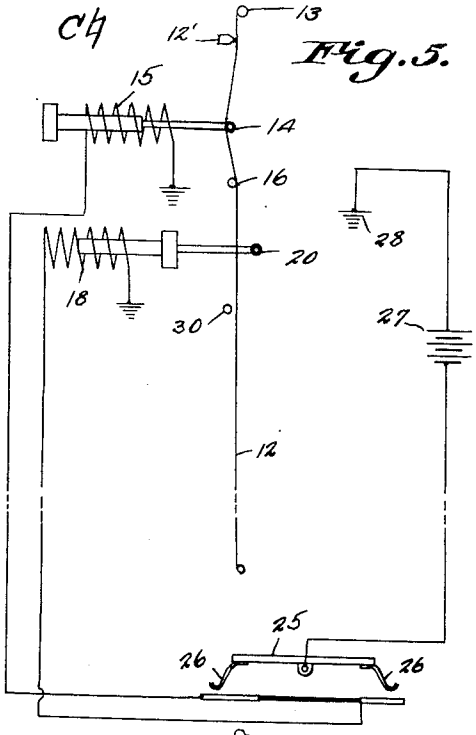


Fig. 5.

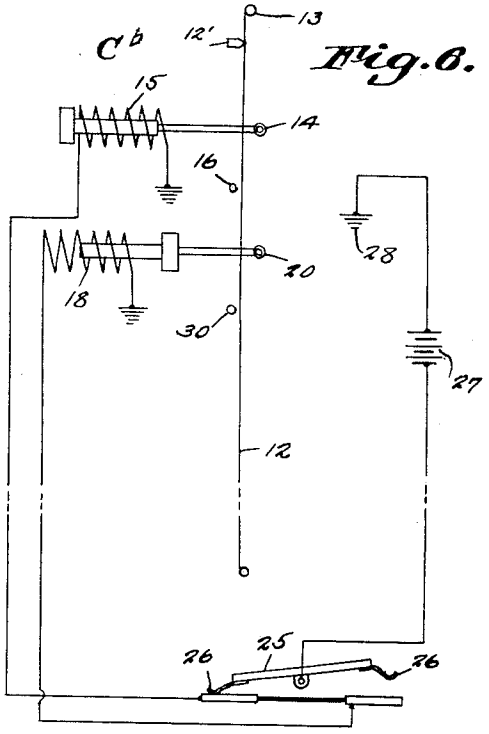


Fig. 6.

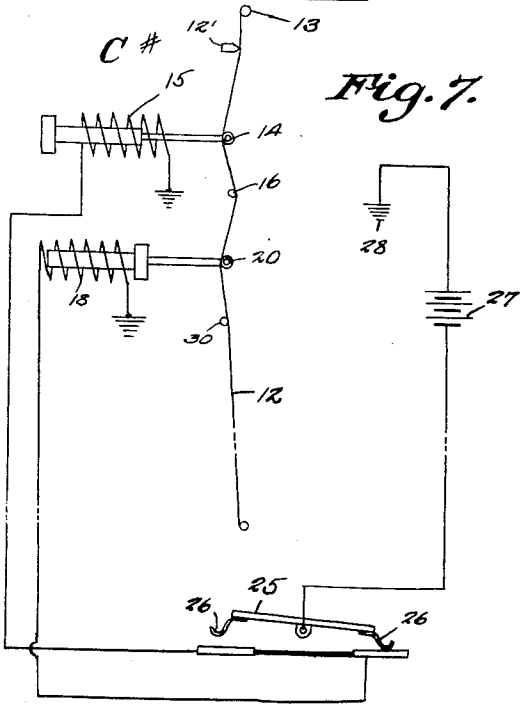


Fig. 7.

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ELECTRICALLY OPERATED KEY-CHANGING HARP MECHANISM

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Application November 13, 1953, Serial No. 391,918

2 Claims. (Cl. 84—266)

This invention relates to a harp and has its particular application in a means for electrically controlling the tuning of the strings of said harp.

A further object of the invention is the provision of solenoid means for instantly changing the pitch by shortening the vibrating length of the strings of the instrument.

Still another object of the invention is the provision of means whereby the operation of a harp may be accomplished by electrical means in lieu of the conventional foot pedals and multiplicity of mechanical elements utilized for this purpose in conventional harp construction, thereby simplifying the operating mechanism and consequently appreciably reducing the cost of the harp, as well as eliminating noise incident to the operation of the foot pedal and numerous mechanical elements of the harp action.

Still other objects reside in the combinations of elements, arrangements of parts and features of construction, all as will be more fully pointed out hereinafter and shown in the accompanying drawings wherein there is disclosed a preferred embodiment of this inventive concept.

In the drawings:

Figure 1 is a side elevational view of a harp, partially broken away.

Fig. 2 is an enlarged sectional view disclosing the solenoid operation and its associated elements.

Fig. 3 is a fragmentary sectional view disclosing certain parts of the mechanism illustrated in Fig. 2, the section being taken on line 3—3 of Fig. 2.

Fig. 4 is a side elevational view of the mechanism disclosed in Fig. 3.

Fig. 5 is a schematic view showing the electrical circuit of Fig. 3.

Fig. 6 is a view similar to Fig. 5 but showing certain elements in a different position of adjustment, and

Fig. 7 is a view similar to Figs. 5 and 6 showing a still further disposition of the elements of the circuit.

Similar reference characters refer to similar parts throughout the several views of the drawings.

As conducive to a clearer understanding of this inventive concept it may be here pointed out that the conventional harp is tuned to a flat below the normal register of the strings, and adjustment is made to produce a natural tone by certain foot pedals. Conventionally these foot pedals number seven and upon pressing the pedal a peg is turned to atune the string to its proper pitch.

A primary object of the invention is the achievement of change of pitch my means of a solenoid which serves to change the vibrating lengths of the string of a harp in the manner which is customary by use of the conventional foot pedals.

Having reference now to the drawings in detail there is generally indicated at **10** a harp which includes a frame **11**, and the customary number of strings **12** which rest on the notched nuts **12'**. As previously set forth the strings **12** are normally tuned flat, and are secured to

tightening pins **13** inset in the frame **11**, as best disclosed in Fig. 2.

In order to change the vibrating lengths of the strings to change the pitch thereof there is provided a first solenoid **15** which is provided with a plunger **14**, which is adapted to draw the string **12** against a fret **16**. A coiled spring **17** is adapted to replace the solenoid **15** upon release of the electrical energy which energizes the solenoid, thereby holding the strings against the fret **16**, tuning the strings in the key of C.

A second solenoid **18** is also provided and includes a coiled spring **19** together with a plunger **20** which is adapted to depress the string **12** against a second and smaller fret **30** for further variation in the tonal pitch of the instrument.

Having reference to Figs. 5, 6 and 7, there is disclosed in Fig. 5 a solenoid **15** as energized which retracts the string **12** against the fret **16**, which produces a natural tone over the flatted string. This is accomplished by means of a foot pedal **25** bearing two contacts **26** and when the foot pedal is in normal or flat position no circuit is closed through battery **27** to a ground **28** thus normally retaining the string in retracted position against fret **16** by the deenergization of both solenoids which shorten the vibrating length of the string to provide a natural open tone over the basic flat tuning of the conventional harp string.

As shown in Fig. 6, depression of pedal **25** to the left energizes solenoid **15** to release string **12** to its flatted position undepressed against any fret.

Depression of pedal **25** to the right as shown in Fig. 7 energizes solenoid **18** and releases solenoid **15** to occasion maximum depression of string **12** against both frets **16** and **30** to provide maximum sharpness of tone.

From the foregoing it will be seen that there is herein provided a harp mechanism which is adapted to be operated in the same manner as the conventional harp, but which is operated electrically by means of a solenoid for the desired fretting of the strings to produce different tones as may be desired.

It will also be seen that there is herein provided a harp which accomplishes all of the objects of this invention, and others, including many advantages of great practical utility and commercial importance.

While I have shown and described in detail the electrically controlled means as operating a single string of a harp, it is to be understood that a plurality of the solenoids will be wired in many predetermined combinations enabling the harpist to instantly change the tuning from one tuning to another, thereby contributing to the ease in playing accidentals.

As various embodiments may be made of this inventive concept, and as various modifications may be made in the embodiment hereinbefore shown and described, it is to be understood that all matter herein is to be interpreted merely as illustrative and not in a limiting sense.

I claim:

1. In a stringed musical instrument, the combination of a frame, string fastening means secured thereto, strings secured by said string fastening means, a plurality of fret means secured to said frame adjacent each of said fastening means for one of the ends of each of said strings and underlying each of said strings, plunger-type solenoid operated means mounted in said frame between adjacent pairs of said plurality of fret means, the fret means of each of said plurality of fret means adjacent its associated string fastening means being of such size that the string associated therewith is in constant contact therewith, the remainder of each plurality of fret means being successively smaller to provide a distance between any fret means and its associated string which is increased proportionally with

the distance such fret means is positioned from its associated string fastening means, first solenoid operated means including a solenoid, a biasing means and a plunger provided at one end with an arm perpendicular thereto overlying its associated string, whereby activation of said solenoid draws said associated string against the associated adjacent fret means to determine the effective vibratory length of said string to sharpen the tone produced thereby, said biasing means tending to restore said arm to clearingly overlie its associated string upon deactivation of said solenoid, a second plunger-type solenoid operating means biased to draw the associated arm to hold said string against the two adjacent fret means whereby activation of said second solenoid releases the arm to clearingly overlie the said string which clearingly overlies the one of said adjacent frets that is farther from the said string fastening means to flatten the tone produced thereby, and a pedal operated switch electrically connected to a power source and selectively connected to groups of said first solenoid operated means or to groups of said second solenoid means.

2. The combination of claim 1 wherein the stringed musical instrument is a harp.

References Cited in the file of this patent

UNITED STATES PATENTS

565,739	Gilman	Aug. 11, 1896
1,692,123	Hull	Nov. 20, 1928
1,775,462	Hull	Sept. 9, 1930
2,459,103	Adair	Jan. 11, 1949

FOREIGN PATENTS

584,558	Germany	Jan. 3, 1935